Radiant Temperature Sensor
TY7321

General

The radiant temperature sensor measures infrared radiation at the perimeter on a wall. The infrared radiation is one of the critical elements that determine what is perceived as heat. Including information on infrared temperature in the setpoint of air handling units makes it possible to enhance the comfort of the occupants.

Features

- The radiant temperature sensor provides non-contact and remote measurement of radiant temperature from windows or walls.
- Ideal for the measurement of thermal environments in spaces where radiation has a major influence on perceived temperature.
- Can be installed in a variety of ceilings including facility plates or sound-absorbing ceilings.
- Thermopiles are used as sensing elements.
- High responsivity and repeatability
- For ceiling-mounted return-chamber air conditioning installations, a sensor-mounted model can be used.
- Changes in measuring area, installation and maintenance can be carried out from inside the room.
- By connecting to Azbil Corporation's air conditioning controllers or building automation systems, the sensor provides more comfortable control which takes account of the impact of radiation.

Measurement principle

All objects radiate infrared rays in relation to their surface temperatures. Detecting the energy volume of these infrared rays allows the measurement of radiant temperatures.

The TY7321's thermopile sensing element converts infrared radiation to electricity and outputs a signal via an internal signal processing circuit.

Specifications

Item	Specification
Sensing range	Radiant temperature: 5 °C to 50 °C
Sensing accuracy	Radiant temperature: +/-2 °C (ambient temperature 25 °C) Room temperature: ±0.35 °C (TY7321B), ±0.7 °C (TY7321C)
Power supply	24 V AC +/-15 %
Frequency	50/60 Hz +/-4 %
Power consumption	Max. 0.3 VA
Output signal	Radiant temperature: 1 to 5 V DC (corresponds to radiant temperature 0 to 50 °C) Room temperature: Pt3KΩ (TY7321B), Pt100 (TY7321C)
Time constant	Radiant temperature: Max. 10 seconds Room temperature: Max. 3 minutes
Rated conditions	Ambient temperature: 15 to 35 °C Ambient humidity: 10 to 90 % RH (non-condensing) Vibration: 2 m/s² (10 to 55 Hz)
Transport/storage conditions	Ambient temperature: -20 to + 60 °C Ambient humidity: 5 to 95 % RH (non-condensing) Vibration: 9.8 m/s² (packed)
Effective range	52 °
Sensor coverage	344 ° (horizontal) 65 ° (vertical, in 5 ° steps)
Weight	Approx. 200 g
Color	Base, housing, terminal cover: DIC 546 1/2 Cover: White Case, housing, cover of sensor : White
Materials	Base, housing, terminal cover : Molded polycarbonate resin, equivalent to UL V-O Cover : Molded fire-resistant ABS resin, equivalent to UL V-O Case, housing, sensor cover : Molded polycarbonate resin, equivalent to UL V-O

Safety Instructions

Please read instructions carefully and use the product properly. Please keep this instruction on hand for reference at any time.

Usage Restrictions

This product is targeted for general air conditioning. Do not use this product in a situation where human life may be affected. If this product is used in clean rooms or places where reliability or control accuracy is particularly required, please contact Azbil Corporation's sales representatives. Azbil Corporation bears no responsibility for any benefit, or lack of benefit, derived from the operation by the customer.

⚠ CAUTION

- Installer must be a trained, experienced service technician.
- Check the ratings given in this instructions to prevent equipment damage.
- Check the environment given in this instructions to prevent equipment damage.
- Disconnect power supply before wiring to prevent electrical shock or equipment damage.
- All wiring must comply with local codes and ordinances.
- Use crimp contacts with insulation jackets for wire terminals.
- Do not remove or disassemble casing except for wiring. May result in equipment damage.
- Use an insulating transformer to supply 24V AC. Do not share power supply with other equipment. A loop is formed at the common and may cause equipment damage.

Models

TY7321A1001	W/o room temperature sensor, box type
TY7321A1009	W/o room temperature sensor, Boxless type
TY7321B1004	W/ room temperature sensor (Pt 3K), box type
TY7321B1012	W/ room temperature sensor (Pt 3K), boxless type
TY7321C1007	W/ room temperature sensor (Pt 100) box type.
TY7321C1015	W/ room temperature sensor (Pt 100) boxless type.

Dimensions & Parts Identification

Boxless type

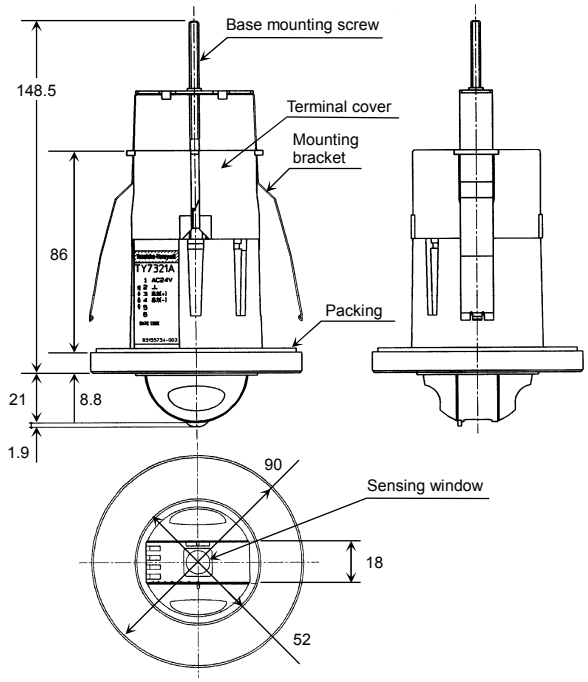


Fig.1 Boxless type dimensions (mm)

Box type

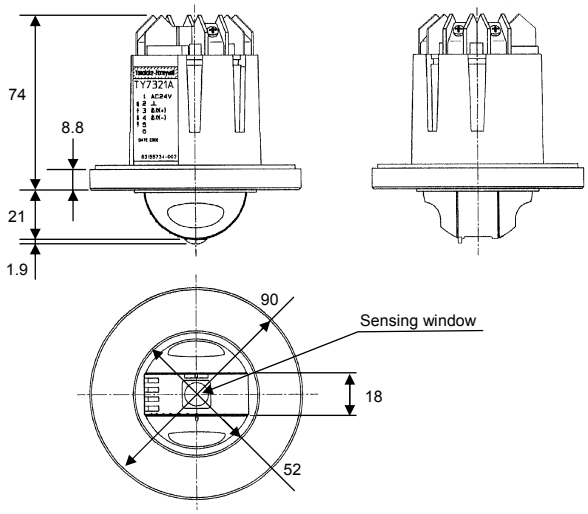


Fig.2 Box type dimensions (mm)

Installation

Installation Location

Make sure the installation is :

- Within the area to be sensed
- Away from lights
- Away from direct air flows
- 1 to 3 m away from window surface

Connection/Wiring

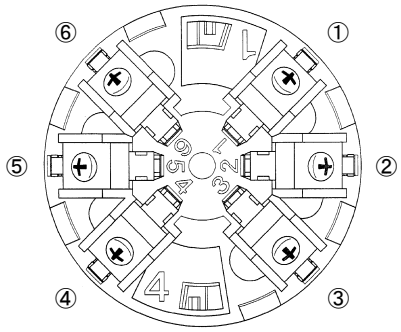


Fig.3

Table 1

Terminal #	Connection destination
①	24V AC (~)
②	24V AC (⊥)
③	Radiant temperature output (+)
④	Radiant temperature output (⊥)
⑤	Room temperature sensor output
⑥	Room temperature sensor output

⚠ CAUTION
Disconnect power supply when wiring to prevent electrical shock and equipment damage.

Wiring Instructions

Use M 3.5 connection terminal. The width of crimp-style terminal must be the maximum 7.2 mm. Shielded multi-core cables (CVV-S) of 1.25 mm² is recommended. A 1.25 mm² IV cable may be used.
Be sure to ground the shielded cable on the controller side. Use separate conduit for the power and the signal.
The maximum cable length is 100 m.
For TY7321C, connect the compensation line to the terminal #6 together with sensor output.

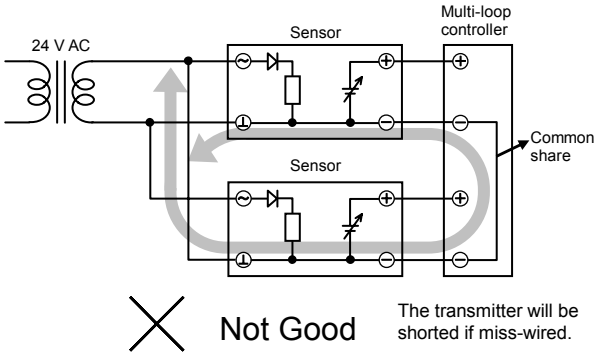
Always check wiring before supplying power.
Never share 24 V AC transformer to other products.

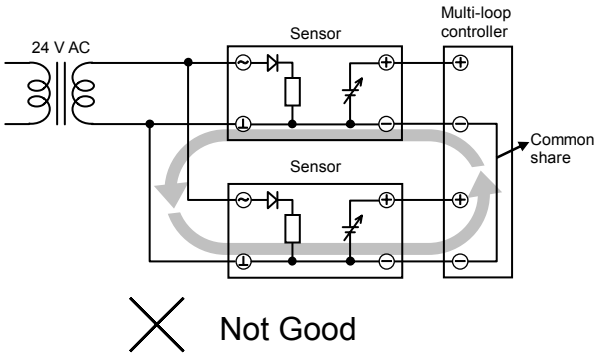
Use of individual AC transformer

⚠ CAUTION

Use insulated transformer to supply 24 V AC power supply voltage.
Never share 24 V AC power supply with other equipment.
If a transformer is shared with other equipment, loop will be formed at common and the sensor may be damaged.

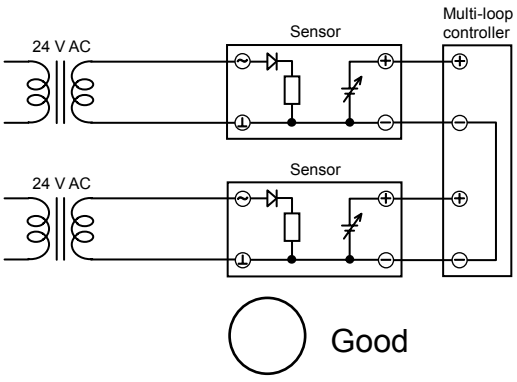
- Transformer (24 V AC power supply) shared





Common loop formed

- Transformer (24 V AC) separated



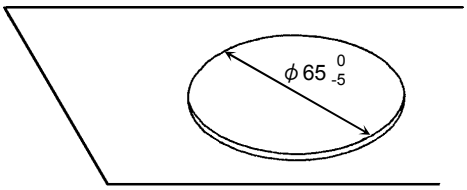
No common loop formed

Follow the next instructions to prevent an induction current flowing from the sensor to the controller input circuit, or to prevent an influence on the generating noise due to inadequate time constant of the controller input.

- Use a controller with a low pass filter with a removal ratio of 40dB or higher (normal mode).
- Connect an isolator to the controller input circuit if a removal ratio is unknown.
- If you use a Azbil Corporation cotnroller, no problem will occur.

Boxless type

1) Bore an opening of $\phi 65^{0}_{-5}$ in the ceiling where the sensor is to be installed, and remove the sensor from the body.



2) Pass the wires through the opening and attach M3.5 crimp-style terminals to the wires.
3) Connect the wires to the terminals of the base (refer to Connection/Wiring).

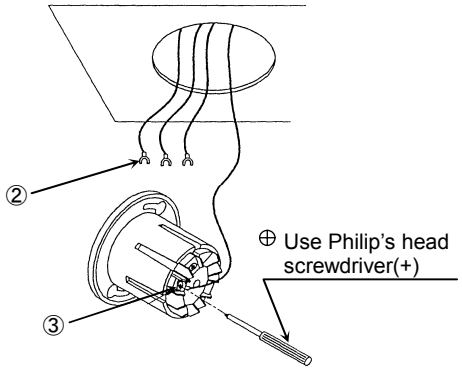


Fig.4

4) When wiring is complete, put the terminal cover over the base. Then pass the wires along the slits and through the round holes.

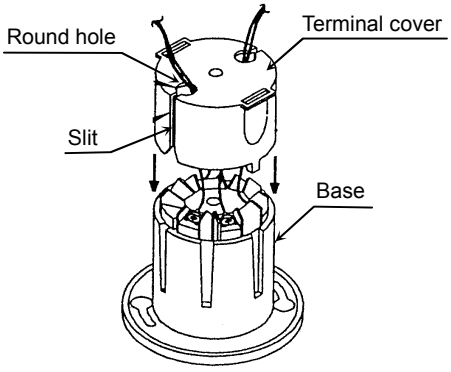


Fig.5

5) Insert mounting bracket into the square holes on both sides of terminal cover. Turn the base mounting screw two or three times to attach loosely.

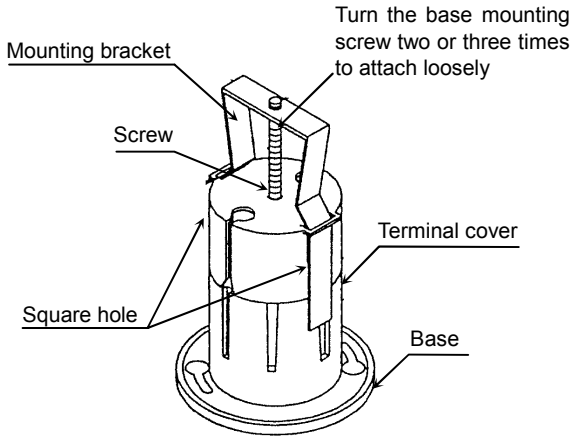


Fig.6

6) Insert the base into the ceiling and tighten the base mounting screw.

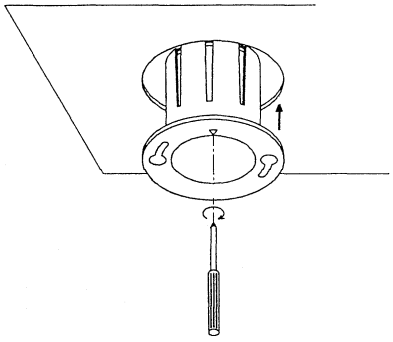


Fig.7

7) Now insert the sensor into the base.

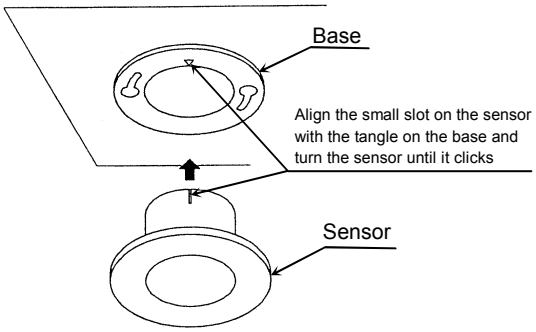


Fig.8

8) Adjust the measurement coverage (refer to Adjustment).

Using outlet box for installation box

1) Bore an opening of $\phi 70^{\ 0}_{-5}$ in the ceiling board where the sensor is to be installed. Then pass wires through the board and attach M3.5 crimp-style terminal.
2) Connect wires to the screw terminal of the base.

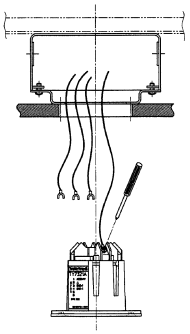


Fig.9

3) Insert the base through the opening and fix the base to the outlet box using M4 mounting screw.

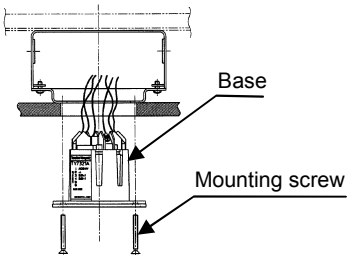
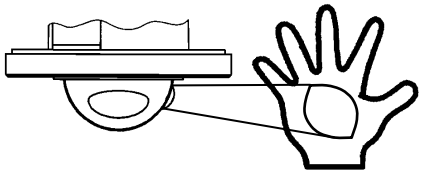


Fig.10

4) Install the sensor to the base.

Checking

1) To make sure that wiring was done correctly, hold the palm of your hand in front of the sensing window.



2) Make sure that sensor output voltage moves between 3 and 4V within 10 seconds.

Adjustment

Turn the setting knob so that the sensing window faces the center of the area of measurement. Use the notched groove next to the sensing window for horizontal movement.

1) The sensor moves 0 ° to 65 ° vertically.

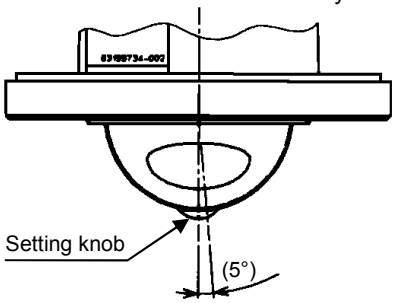


Fig.11

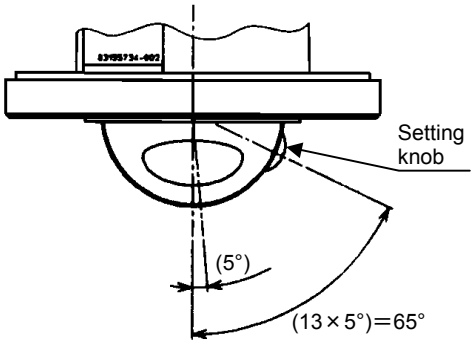


Fig.12

2) The sensor pivots 344 ° horizontally.

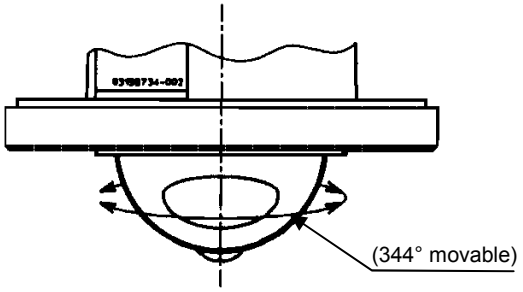


Fig.13

Maintenance

To clean setting window, wipe lightly using cotton swab or soft cloth with alcohol. (Do not use benzene or thinner).

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Specifications are subject to change without notice.

Azbil Corporation

Building Systems Company

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